

# this is LAGO

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# this is LAGO

- LAGO'S PLACE IN THE WORLD
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## INTO LAGO AT ARUBA

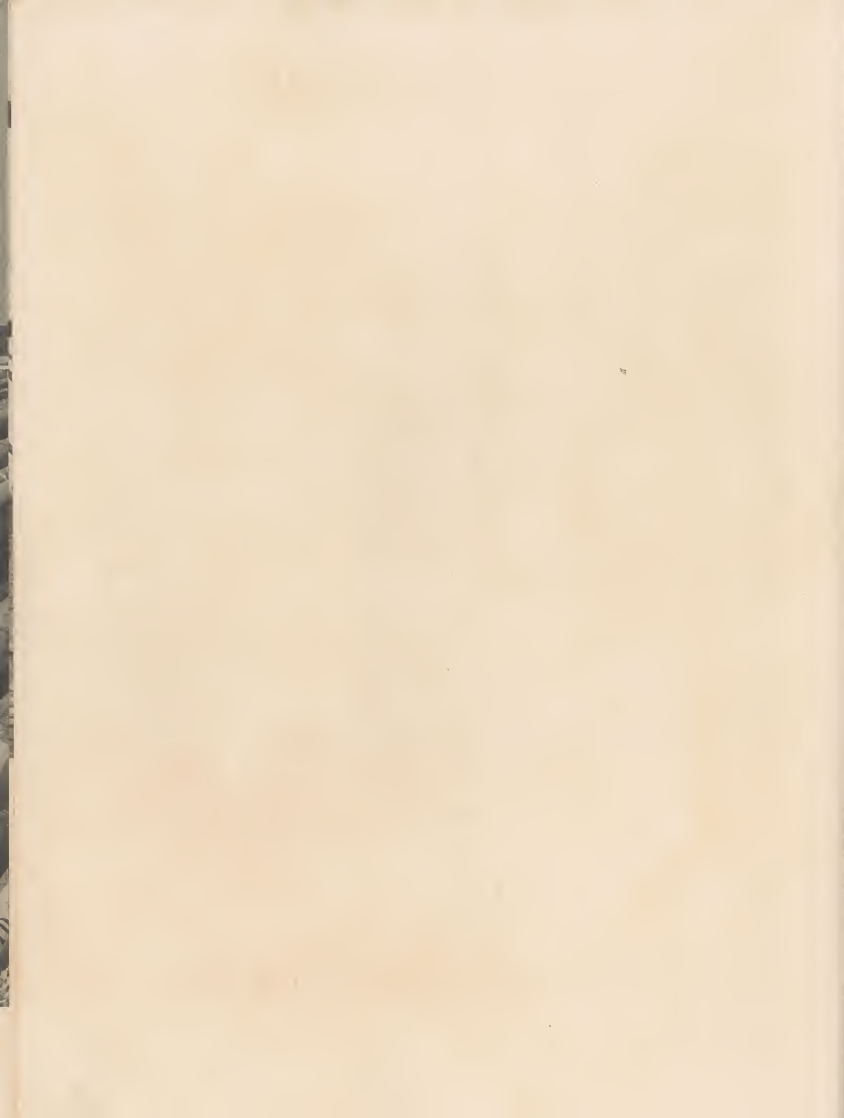
have gone years of research, planning, and experience. Material and equipment by the hundreds of thousands of tons have been unloaded at its docks and fashioned into a forest of steel, wood, and concrete. Millions upon millions of dollars have been spent.

At the heart of all this are the employees who make the lifeless equipment—the plans, the materials, and the dollars—come alive as a great industrial enterprise.

## TO THE EMPLOYEES

*the men and women in the Plant, the men in  
the Fleet—who help maintain the Lago refin-  
ery in its high place in the petroleum world*

THIS BOOKLET IS DEDICATED





## LAGO'S PLACE IN THE WORLD

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Lago's diesel oil furnishes power for railroad trains in many parts of the world.

IF A LAGO employee could follow one barrel of gasoline or fuel oil or any other product which he helped to make, after it left the refinery, he would see strange and new parts of the world. His journey, which would start aboard a tanker, might take him to Bayonne, New Jersey, and from there he might go to New York, or Philadelphia, or to any other city in the eastern United States.

He might follow somebody's automobile, or ride one of the thousands of trucks that haul food from country farms to huge cities. He might go to the farms themselves, where Lago-made fuels help drive tractors and other equipment which prepare the ground for the growing of valuable crops.

Or he might find himself in the Antarctic, where Lago's fuel oil furnishes power for Norway's huge whaling ships. He might be on any




Oil from Lago may be found in the bunker tanks of ships on every sea.

of the seven seas, with Navy vessels whose fuel came from Aruba, or with any of the world's merchant fleets. He might follow this barrel to Iceland or Norway; to an asphalt airport runway in Spain; or to a cottage in Sweden where, by the light of a kerosene lamp, the housewife cooks her family's meal with Lago kerosene.

In European countries millions of people depend on oil from Lago. In fact, if the Lago refinery were to be shut down tomorrow the effect on Europe would be almost as disastrous as war.

The Europeans have little oil of their own. They must depend on others to send it to them, and Lago is a very important source of supply. They need Lago oil to help raise and transport their food. Without it there would be less light in London and The Hague; the industries of Manchester and Oslo would slow down; winter's cold would be more deeply felt in millions of homes.

The world cannot get along without oil, and that is the same as saying that the world cannot get along without Aruba and Lago.



**Millions of people depend on LAGO'S petroleum products**

An approximate distribution of Aruba's products as estimated for the year 1949

CANADA

UNITED STATES

LATIN AMERICA

EUROPE

2%

35%

28%

35%



## THE BEGINNINGS

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IN DECEMBER, 1928, as construction of the Lago refinery neared completion, Aruba's population was small. Fishing, hat-making, and the growing of aloes were the chief industries. Aruba's ten thousand citizens had been content with an uncomplicated life in which there had been few changes from one decade to the next.

Lago itself, although it displayed the hustle of heavy construction, was a baby in both age and size in December, 1928. It had only the newly opened harbor (with one narrow entrance and a cramped interior), a handful of tanks, a few small ships to fill them with oil, eight topping stills almost completed, and eight cracking stills begun. Built on the bare solid coral of Aruba's easternmost point, two thousand miles from its source of food, water, and equipment, 150 sea miles from the oil it would refine, its great future was unpredictable.

Now, twenty years later, Lago is a shipping operation so large that its harbor ranks in tonnage

Right—Estanislao Martin of the Field Engineers uses a transit in a surveying crew.

Below—Imagine yourself on top of the Warehouse, looking east toward the stills. This was the view in 1927. No. 1—Where Powerhouse No. 1 now stands, No. 2—Then a bunkhouse, now No. 2 Laboratory, No. 3—Now the main refinery road, No. 4—Now the main area of stills, No. 5—Then the old road which in years past led from the phosphate mines to the harbor; now at the far end, a portion of it serves as the road around the tank farm to San Nicola.





View due east from point near No. 1 Powerhouse. 1—Present Cracking Plant area. 2—Site of "Cat" Cracker. 3—Old Hospital, later Personnel Building, now site of "Cat Plant" Com-

pressor House. 4—Bungalows 1-15, now site of No. 3 Laboratory, Main Office, and No. 2 Powerhouse. 5—Main refinery road, then and now.

among the world's greatest; Lago's employees form a unique community whose members make up half the island's population, and hail from Singapore to Chicago to Guadeloupe; Lago is one of the world's largest petroleum refineries. This is Lago's story, told as it rounds out twenty years from the first small gush of oil into the stills in January, 1929, to the 400,000-barrel daily flood of January, 1949.

Lago's first interest in Aruba came in 1924, when Captain Robert Rodger and two associates were sent into the Paraguana-Curaçao-Aruba triangle to find a shipping terminal for oil being produced at Maracaibo by the Lago Petroleum Corporation. In August, 1924, after exploring the possibilities at the first two sites, they visited Aruba. For two weeks they studied the problem of dredging a channel through the narrow break

in the reef that connected the bay with the sea. San Nicolas was their choice, and dredging began late in 1925.

A channel first had to be cut through the reef (now the east entrance) and a great amount of dredging was required to deepen the bay for ships that would draw twenty-five feet of water when loaded. Work was begun soon afterward on what is now the main dock, and eight 70,000-barrel crude tanks were constructed.

Meantime, two small ships were sent out from England to haul crude oil from Lake Maracaibo. One, the *Francunio*, eventually was returned to Europe for harbor bunkering duty, and had honorable service in the last war. The second, the *Inverampton*, shows only as a cross on the charts of the Maracaibo sand bars, where it was lost in 1928. The *Invercorrie* was added in 1925, and

four ships of the *Inverlago* class the following year. These ships loaded crude in Lake Maracaibo and discharged it into a depot ship at Oranjestad, which in turn pumped it into other tankers for ocean transport.

Lago's harbor officially began its career as a great oil port November 17, 1927. Two ocean tankers and five lake tankers entered the first day.

San Nicolas, whose harbor had been a haven for fishing and phosphate-carrying sailing vessels, and whose beach had been a flat and barren expanse of cactus and low shrubs, was never the same again. Industry and world trade had come to stay.

The operating staff at San Nicolas lived then in twelve frame houses which still are in use. It wasn't an easy life. In the words of Captain Rodger, "Fresh meats, fruits, and vegetables were unknown and all edibles were to be found only in cans, but occasionally small luxuries were brought over by the lake tankers from Venezuela. Ice was brought over from Curaçao and was usually transported in open barrels. Chickens pro-

vided the main staple of diet, and could be purchased at Fls. 40¢ to 50¢ each. Eggs were a penny or two each."

The year 1928 brought more deep and permanent changes to Aruba's landscape and life. In July, 1927, initial plans were made to build a refinery somewhere in the Maracaibo area for processing Venezuelan crude.

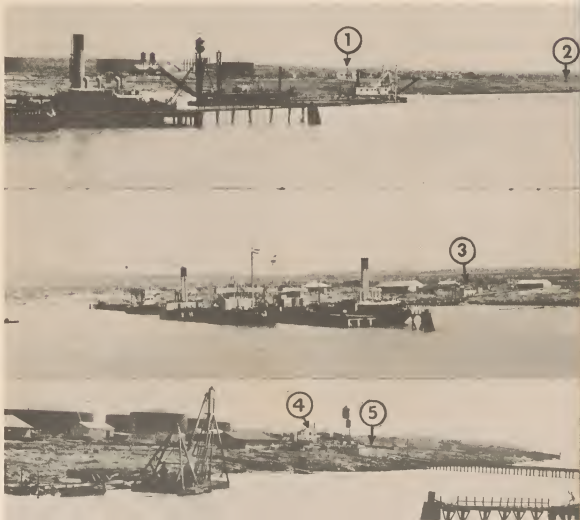
An inspection group, including Paul H. Harwood, Thomas S. Cooke, Lloyd G. Smith, and Donald J. Smith, visited Maracaibo and Aruba in August, 1927.

In years to come, each of these pioneers continued in close association with the enterprise they launched. Mr. Harwood became an executive in marine affairs, Mr. Cooke in refining, Mr. D. J. Smith directed construction at Aruba, and L. G. Smith was Lago refinery's general manager from the early thirties until 1946.

Again Aruba was the choice. From the top of a water tower in the harbor area these men looked at the transshipping station, only a little cluster of tanks, houses, and sheds huddled next to San Nicolas Bay, with bare coral beyond. But in their

#### Lago in 1927:

- 1—Captain Rodger's house, later Executive Office, now parking area between M. & C. Office and No. 1 Laboratory.
- 2—Then, not a thing between this point and Curaçao. Now, the arrow points to main still area.
- 3—This, plus a few tanks out of the picture to the right, was all there was to Lago when the harbor opened in November, 1927.
- 4—Oldtimers speak affectionately of the "Old White House," long in the center of Lago operations in Aruba. Originally a country house, it furnished living quarters and then offices for the embryo transshipping station, later became a messhall, and finally a Labor Office, before it was torn down in the early 1940's.
- 5—Present Receiving and Shipping Office rests on this foundation, which was then a separator box.





mind's eye they saw rows of stills and acres of storage tanks, pipelines, warehouses, shops, hospitals, and homes. During the homeward trip to New York the major details of the original plant construction were decided.

San Nicolas continued to operate as a transshipping depot for crude oil through 1928, loading four or five ships a week with oil brought in by the steadily increasing number of lake tankers. During one high point of the year the station loaded a ship a day for one hundred days. Captain Rodger, who was possibly the best-known man in all Aruba for over fifteen years, moved

into an eight-room stone building constructed on what is now the parking area between the Maintenance & Construction Office and Laboratory No. 1. This building later served as the Company's Executive Office.

Final approval for the refinery came in February, 1928, and the first men arrived February 24 to start housing accommodations for the construction forces.

Donald J. Smith still recalls the delays, inadequate equipment, labor and housing shortages, difficulties in securing sufficient food and water, and countless other complications that went with

a pioneering operation nearly two thousand miles from the source of supply. A report he wrote tells the end of the refinery's first phase:

"All of the energy of the original construction force was devoted toward the construction and completion of the powerhouse and topping stills. The powerhouse started in December, 1928, and the topping stills in January, 1929, and while the operation was somewhat ragged, the plant had actually started to earn money."

January 29, 1929, is recorded as the first day on which the stills were operated.

## As they saw them

Over a hundred men who were with Lago before the first barrel was run are still with Lago as it forges toward its second billionth barrel. How these men lived and worked, as seen in the reminiscences of a few, best shows the vast changes which have taken place in Lago and in Aruba with the passing years.

Jose Oduber of Oil Accounting, who was hired in September, 1925, well remembers Lago's Oranjestad days. When he took the job of cable clerk, paymaster, and general office man, Lago's total payroll at the Oranjestad office (now C. H. G. Eman's office and home) consisted of seven men, and a woman who cleaned up around the place. Sometimes, he says, the whole company knocked off in the middle of an afternoon and went swimming. On the other hand, the whole company was likely to work at night or on Sunday when a ship finished loading and was ready to put out to sea. He still has a record of the loadings: six ships were filled from the depot ship in 1924, 57 in 1925, 80 in 1926, and 148 in 1927 up to November, when the business moved to San Nicolas.

Ralph Watson of Receiving & Shipping lived during 1925 in the "White House" at San Nicolas Bay. He, an assistant, and some helpers took soundings in the bay, cleared away cactus on the shore, and put in a small water line to Mangel



Cora, an old well south of the lighthouse. They finally ran out of things to do, and spent several months fishing while waiting for the dredge to arrive.

Pedro de Windt of Receiving & Shipping re-





Oranjestad changed greatly with the passing years. This is now the center of the main business street.

members that one of his first jobs with Lago was greasing the machinery of a row of windmills near the lighthouse, where water for washing, and sometimes drinking, was secured.

Fred Penney, assistant division superintendent, came in June, 1927, to erect boilers and machinery. He recalls how popular he was one day when he figured out a way to increase the production of ice from three blocks to twenty blocks a day. (Today's ice plant turns out four hundred.)

Henry Fujooah of the Lower Yard Electric Shop came to Curaçao from Surinam to look for work in 1926, and moved on to Aruba when he heard about the new refinery. He lived at first in a thatch-roofed hut about where the Customs House at the head of the Finger Pier now stands. He and his bunkmates had cots to sleep on, but

on rainy nights they slept under the cots to keep dry. He says the first electric shop was a surplus telephone booth that had been intended for the dock but never used, and that the first "powerhouse" had only three 1-KW steam generators, used simply for lighting the tiny installation at night. Steam was supplied by a row of ten drilling-rig boilers that had been sent over from the Maracaibo fields.

Captain William Craig, who came from England in 1925 as mate of the *Invercaibo* and is now senior officer of the Fleet, especially remembers the leisurely pace of the prerefinery days. The ships often waited a week for their turn to load at Maracaibo. There were no navigation lights on the narrow channel between lake and sea, and if they approached it near the end of the day they always anchored to wait for a daylight crossing.



## THE MIDDLE YEARS

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A REFINERY is a living organism. It grows and changes all the time. At Lago the growth and changes have sometimes been rapid, at other times minor and gradual.

There were several major periods of construction during the refinery's history:

The original installation took place between 1928 and 1931, when the low pressure stills, combination cracking coils and visbreaker units, utilities, pumphouses, tankage, and pipelines were built.

In 1935-1936 a crude still was added, cracking units were remodeled, and more tankage was built.

In 1937 the west entrance was cut through the reef, and ships no longer had to turn around in the narrow harbor.

In 1938 and 1939 over 22 million dollars went into expansion. Stills were added, a number of units were reconstructed, gasoline storage spheroids were built, and the docking space was greatly increased.

A third-grade class in the Lago School poses happily for its picture.



The last big construction period was in 1942-1943, when 19 million dollars went into a wide variety of new equipment, most of which was used to meet wartime demands for high-octane gasoline. One lake tanker and two ocean tanker berths on the reef were also constructed.

The same period saw the slow but steady development of the rough "oil camp" of January, 1929, to the settled community of January, 1949. Temporary shelters changed to well-built homes, good shops, and paved streets that spread out from the refinery's edge.

The refinery's main entrance was shifted from a point below the Acid Plant to its present location in 1931, and San Nicolas pivoted with it. The town, previously strung out in a single rocky street west of the plant, fanned to the north and east, but still focused on the spot where most of its residents enter each day to work. Churches, stores, theaters, schools, street lights, pavements, and buslines followed the growth in the area's population.

Aruba operations had been taken over by the Standard Oil Company of Indiana, through acquisition of the Pan American Petroleum & Transport Company, in 1929. Three years later

they were purchased by the Standard Oil Company (New Jersey) and resumed the original "Lago" name.

In 1937 the Lago Heights community, with 150 houses, and later bachelors' quarters, a dining hall, clubhouse, and sports field, was built by Lago.

In 1938 a \$200,000 hospital was built on a high knoll northeast of the refinery; then, because changing petroleum requirements made this space urgently needed for gasoline storage, the hospital was cut up into chunks, and moved piece by piece on a special half-mile railroad to the top of its present hill.

In 1939 Essoville, the first group of seventy-seven bungalows, was constructed for employees by the Home Building Foundation. Sixty-seven more were added in 1947.

In the Colony, bungalows were picked up like chessmen and dropped into distant open spots, making way for No. 3 Laboratory, the Main Office (which was built in 1940), and No. 2 Powerhouse.

There were 5,800 employees in the refinery in 1939, and the crude oil runs had reached 230,000 barrels per day.

A growing number of well-built houses is being provided for employees by the Home Building Foundation.



## THE WAR YEARS

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LOADED TANKERS ANCHORED just off the reef flared up like gigantic torches a few hours before dawn on February 16, 1942. Shells screamed over the refinery to explode in the tankfarm and hit the residential area to the north of it. Aruba knew it was really at war.

Lago had been in the fight for a long time. The refinery started furnishing petroleum products for the Allies with the outbreak of hostilities in Europe on September 3, 1939. Germany started into Holland and Belgium on May 10, 1940, and by sunrise next morning all the German nationals in Aruba were on their way to internment in Bonaire. War was on the Aruba doorstep for a long time after that, but with the February 16 attack it opened the door and walked in.

Aruba went to bed the night of February 15, 1942, expecting the usual good night's sleep. Although there had been a few ship-sinkings in distant parts of the Caribbean, and the U. S. Army Air Forces had established squadrons of bombers and fighters that patrolled regularly out of Dakota Field, the war in Europe was far away.

Over a thousand American troops had landed February 11, and their big and little guns, field telephone wires, searchlights, and big stock piles of shells beginning to appear in isolated places were exciting and at the same time a great comfort. But the troops were still setting up their equipment.

At 1:30 next morning, February 16, they saw action they hadn't expected. With a thundering explosion that was followed immediately by flames rising hundreds of feet into the black sky, a torpedo hit the lake tanker *Pedernales*, anchored just off the reef. A few minutes later the *Oranjestad*, anchored several hundred yards away, also took a torpedo and appeared to dis-

solve into a sheet of flame. Then red-hot shells from the submarine's deck gun began to arch over the lagoon into the refinery area and to the north of it.

The *Pedernales* gradually drifted away, taking its lake of blazing oil along with it. Within an hour the *Oranjestad* sank where it was anchored, and the spot was marked by an oil slick for two or three years afterwards.

Ashore, as the Lago area was shelled briefly, men and women moved in restless little groups, examining each wild rumor as it came along. Army Air Force planes droned overhead. Hours later, as the fires beyond the reef flickered out and the ambulance made steady trips to the Hospital with survivors, Lago settled down into the total blackout of war. The area nearest the tankfarm was evacuated. Some residents moved to the Community Church, and others moved in with friends farther away from the millions of barrels of oil and gasoline in storage.

At different times during the war, Lago's millions of barrels of oil were guarded by Netherlands, French, British, and U.S. troops.





Smashed and burned by a German torpedo that struck it just off Aruba's shoreline, this ship, the *Pedernales*, sailed again. Divers cut it in two pieces, and the separate sections were

floated back to Lago's drydock, where they were temporarily welded together for the voyage to a repair yard in the United States, and a whole new midship section was put in.

Out at sea, however, the night and the tragedy were not yet finished. Two hours after the first attack here, the *Tia Juana* and the *San Nicolas* were torpedoed and sunk, with heavy losses of life.

The next night San Nicolas harbor looked like the inside of a sardine can. Nothing sailed except an Army ammunition ship, and before nightfall all the ships in the area ducked into harbors until a convoy system could be organized.

Before sundown the Army had hauled big guns into the sand dunes between the big and little lagoons, below the harbor, and on the north shore; huge searchlights were everywhere, and an anti-aircraft battery went in between the spheroids and the Hospital. Watching these preparations, Colony residents began to feel as if they were inside a fort—one without walls. The almost constant drone of bombing planes going out on search missions was reassuring.

Most of the plant was shut down until light-shields could be rigged up for the furnaces. All

the sheet-iron roofs of the Pressure Stills later went for this job. Teams of blackout wardens, destined to police the Colony and Lago Heights for many months, were quick to point out any telltale lights.

With the air-war being speeded up and airplane fuel desperately short, the refinery late in 1942 started on the construction of 19 million dollars' worth of equipment that would skyrocket our 100-octane gasoline production. On December 4, 1943, the new equipment was inaugurated. Work, hard urgent work and a race against time, became the order of the day at Lago. "Hopi CON Pronto" became the slogan; it meant "a whole lot of aviation gasoline quick."

Honors were heaped on the men and women of Aruba for their achievements in producing enormous quantities of aviation and motor gasoline, fuel and diesel oil, and other petroleum products for the Allied war machine. Officials of the Army, Navy, government, and Lago's parent company extended high praise for a job well done.

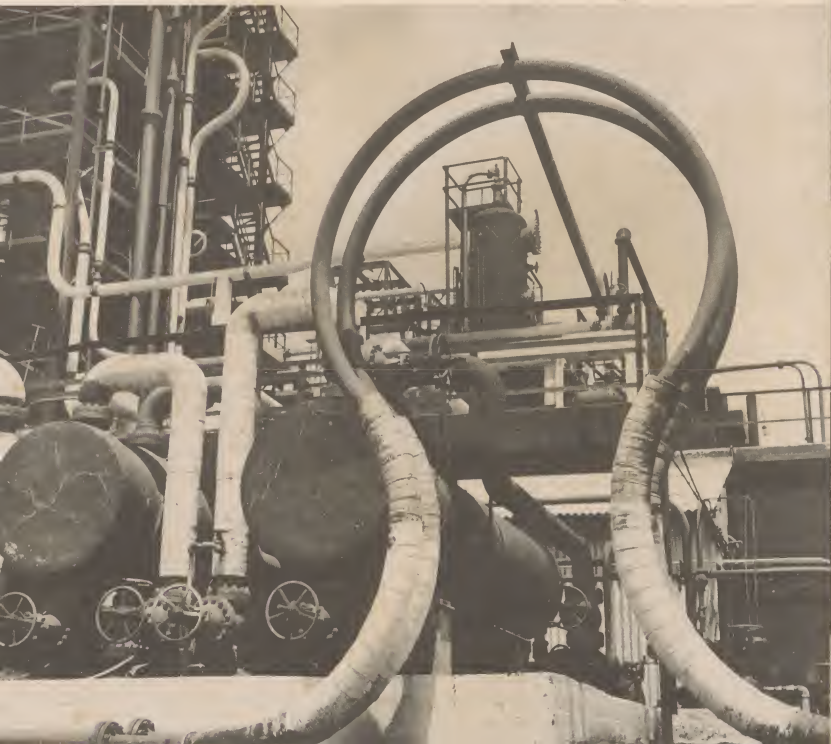
## LAGO TODAY

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NO ONE WHO SAW the eight topping stills and eight cracking units of 1929 could have predicted the refinery's growth into its present size and pre-eminence in the petroleum world. Now one of the world's greatest, the plant represents half of Jersey Standard's overseas refining capacity. With regular daily crude runs of over 380,000

barrels and peaks as high as 434,000 barrels in a day, its throughput equals that of several United States refineries combined.

Its dozens of different grades of refined oil go into the engines and furnaces of Norway, Sweden, Denmark, Finland, England, Holland, Belgium, France, Italy, Switzerland, Spain, Africa,







South and Central America, the Caribbean islands, and the United States East Coast.

Lago's operations are simple by some standards: it makes no lighter fluid, or insecticides, or finished lubricating oil. It puts nothing in little cans or bottles. But it can fill four 100,000-barrel ships today, four more tomorrow, and four more the day after that.

To do this takes men who turn valves and watch gauges, maintaining pressures or levels or temperatures to a fine point; men who fit pipe and weld steel; men who lift and carry; doctors, grocery clerks, accountants, chemists—over 8,000 men and women of 22 nationalities, from 56 dif-

ferent islands or countries, in a smooth-running whole.

They work in the Accounting, Colony Service, Industrial Relations, Marine, Mechanical, Medical, Process, and Technical Service Departments.

The Accounting Department maintains the multitudinous records necessary in an operation of this scope. The Colony Service Department operates residential colonies, laundry, commissaries, and other service units. The Industrial Relations Department assists and advises the management in administering Company policies, and recommends courses of action in promoting stable employee-management relations. The Ma-



rine Department operates the Lake Fleet and the harbor, and repairs and maintains ships. The Mechanical Department builds and maintains equipment, and procures supplies. The Medical Department safeguards the health of employees and their families through the Hospital, Plant and Marine Dispensaries, and a large staff of doctors and nurses. The Process Department performs all the operations involving the handling of crude oil and the manufacturing and loading of finished products. Technical Service designs equipment, analyzes operations, and through the laboratories maintains countless checks on the quality of products shipped as well as products in all stages of manufacture. In addition to these major units, an operations co-ordinating group assists the management in scheduling operations so that the refinery can meet its commitments.

## Process operations

Lago's function is to receive crude oil, change it into products, and keep it until it is called for.

At the heart of this function is the Process Department, which has the oil in charge from the moment it is pumped out of a lake tanker until it is again pumped, usually in greatly changed form, into an ocean tanker. The 1,500 Process employees assist the ships in mooring. They attach hoses between ship and shore, and on lake vessels they co-operate with ships' crews in discharging crude oil to the tank field. They handle all movements of oil through tankage, route it through and operate all manufacturing equipment, load the product into ships, and finally cast off the mooring ropes.

The refinery's raw material, crude oil, is made up of hundreds of components known as hydrocarbons. These boil at temperatures all the way from normal (these are usually gases) up to almost 1,000 degrees Fahrenheit. Because of these differences in boiling point, the hydrocarbons may be separated into a large number of commercial products.





Basically, aside from special treating operations, refining falls into three main categories: distillation, thermal cracking, and the more modern method of catalytic cracking.

In distillation the crude oil is pumped through the coils of a pipe still, where it is heated to a suitable temperature, and then delivered to a tower; gasoline is removed from the top of the tower, kerosene, diesel oil, or heating oil at lower levels, a base stock for lubricating oils near the bottom, and heavy residual fuel from the bottom of the tower.



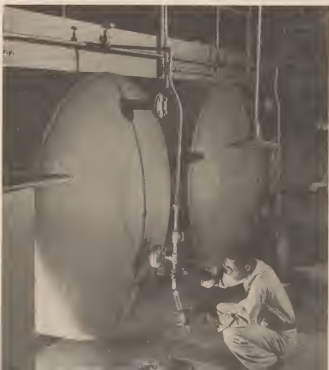
“Cracking” consists of supplying sufficient heat to break up heavy compounds into lighter material which boils in the gasoline range. This may be done by heating the stock to a temperature approaching 1,000 degrees Fahrenheit, at pressures up to 1,000 pounds per square inch, to “decompose” the oil.

The modern technique is Fluid catalytic cracking, involving the use of a powdered alumina catalyst which flows through the “cat” cracker with the oil, and is used over and over. This process, using low pressures, gives higher yields and better products.

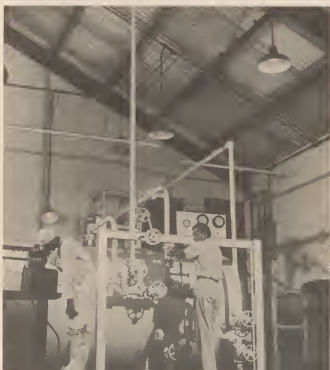
Practically all products receive additional refining before they are shipped, to meet the exacting specifications of the purchasers. All but a few of the many products shipped require blending, with as many as six or seven different base stocks going into a single quality of finished gasoline.

Over forty different types of finished products are loaded into ships, including such items as four grades of aviation gasoline, ten different motor gasolines, two kinds of tractor fuel, and so on through the list of Navy diesel oil, gas oil, lube distillate, naphthenic acid, heavy diesel oil, residual fuel oil, and cut-back asphalt.

Left above: Meters show conditions on all parts of a still as operators run it from a control house. Below left: Gases produced are stored in spheres. Center: A sample is drawn for testing sulfuric acid made at the Acid Plant.



Above: Carlos Nicolas Groes turns one of the thousands of big and little valves that control the flow of oil through pipelines, tanks, and stills. Below: Ethyl fluid is carefully weighed as it is added to gasoline.





Crude and processing equipment available, demand for products, and ship schedules all affect the amount and kind of products that will be made. However, operations must always be planned so that any one of them can be prepared on a few days' notice.

*On March 15, 1945, 16 years after the first barrel, Lago processed its billionth barrel of crude oil. In the four years since then, well over a third of the next billion has been run.*

Above—These hoppers at the "Cat" Cracker can hold over a thousand tons of the finely powdered catalyst used on the unit.

## To do the job

In a year's time Lago receives 131,000,000 barrels of oil brought in by the Lake Fleet, and in the same time pumps 125,000,000 barrels of finished products into the cargo and bunker tanks of ocean tankers. One hundred and twenty-five million barrels would fill enough oil drums, laid end to end, to encircle the earth two times with about five thousand miles to spare. The oil would cover the entire island of Aruba to a depth of nearly half a foot.

Many things enter into the preparation of that vast amount of oil for market, but the most important factor is the experience, skill, and cooperation of every employee. Next is the best of modern equipment, kept modern by alterations and improvements when needed to keep up with rapid technical advancements in refining.

A few more statistics help tell how big Lago is. Every day 266,000,000 gallons of sea water are pumped from the lagoon into the refinery for cooling and other purposes—more water than a big city uses. Every day over a million and a half

gallons of fresh water are used—much of it brought by ship from the United States.

The Plant uses up to 900,000 pounds of steam in an hour, may use as much as 10,000 cubic feet of compressed air a minute. Over 25 million pounds of sulfur are brought from Texas and Louisiana each year to be made into acid for treating products.

Lago is more electrified than any other large refinery. There are approximately 4,300 electric motors, of all sizes up to 1,250 horsepower. The installed power capacity in two powerhouses is

To do the job takes well-trained people. Thousands of employees, from boys of 14 to middle-aged men, have taken part in training courses provided by the Company.



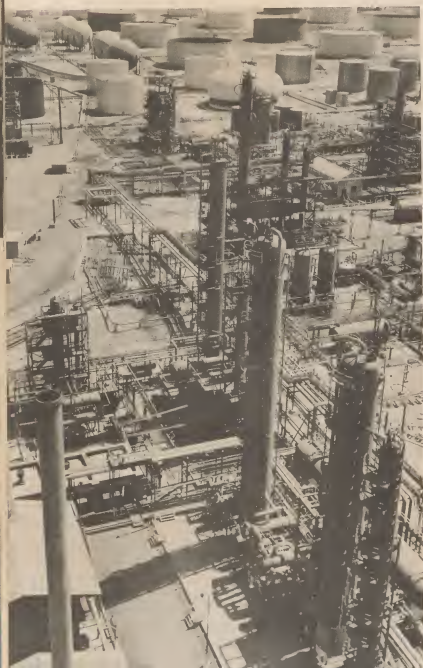


52,500 kilowatts, enough to light an average city of 100,000 people.

Four to five thousand tons of cargo are unloaded at the docks each month to keep the refinery supplied with everything from potatoes to structural steel.

While making fuel for millions of engines, the refinery's own fuel bill is enormous. From the products it makes it must take fuel for its own furnaces and boilers: 3,132,000 barrels per year of fuel oil, eight billion cubic feet per year of gas (a by-product of the refining operation), and 50,200 tons per year of petroleum coke—a "Cat Plant" product which is consumed in the "Cat Plant" as fuel.

Towers, pipelines, and tanks gleam in the tropic sun.



Three thousand pairs of goggles protect employees' eyes from injury; 65,000 coins are needed each month to make up the odd amounts in employees' pay envelopes; supplies and maintenance parts for the refinery number over 50,000, with an aggregate inventory value of nearly six million dollars. The total capacity of the storage and working tanks is 15,742,448 barrels. The annual payroll exceeds \$17,000,000; the Company's total investment in Aruba is over \$80,000,000.

## Planning it

To fit together Jersey Standard's vast pattern of what crude oil it can expect to have on hand, what equipment it has to process the oil, what its customers will want, and what transportation will be available to carry the product to the customer, a Company-wide "outlook" is prepared each year for the succeeding five-year period. One phase of this is the fitting of Lago's operations and capacity into the broad picture of Jersey Standard's world-wide operations.

Outlooks are based on long-range trends: how much of what kind of travel can be expected and what fuel will be used; conversion of heating units from coal to oil; improvements in engine design, and new designs. Markets expand or dry up. A new crude with different characteristics may be found. All these and a host of other factors (including the root of all: general business activity) influence what Lago will be doing one, two, or five years from now.

In addition to the five-year look-aheads, shorter-term yearly outlooks based on similar principles, but with the addition of some sales contracts and other more definite data, are prepared by co-ordination groups.

Finally, to keep up with changing demands and unavoidable delays to ships, monthly outlooks of requirements are prepared; these are usually correct to within a few thousand barrels.



## LAGO'S SEA SIDE

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SOME REFINERIES RECEIVE their crude oil and ship their products entirely by pipeline or railroad tank car. To Lago, however, the sea is all-important as a highway for raw materials and finished products. Its refinery is separated from producing areas by 150 miles, and from markets by 150 to 12,000 miles, all over water.

One of Lago's marine links to the rest of the world is the Lake Fleet, with nearly 60 ships and 1,400 men shuttling ceaselessly between Aruba

and Maracaibo to keep the stills charged with crude oil. Most of these ships were specially built for the service, with wide beams, shallow draft, and twin rudders and propellers for quick maneuvering. They are designed to cross safely over the tricky shifting sand bars that separate Lake Maracaibo from the Caribbean Sea. The earliest lake tankers that are still operating are now twenty-three years old. One of the oldest has made over 2,600 round trips to the lake since

The *Maracay* prepares to tie up at the lake tanker dock.





First Officer Alan Dawes, at the left, and Captain Sydney Mills are both on the bridge as the *Temblador* nears Aruba for a night docking.



Marcolino Breed, during a trick at the wheel, keeps a close eye on the compass.

1925. In recent years a number of ships have been pressed into service on a charter basis, including one of the first ocean tankers that served as a depot ship at Oranjestad in 1925, and even, for a while, a small ship that formerly carried molasses, and another that carried wine between North Africa and France.

Growth of the fleet is dramatically shown by the change in capacity; the original three "lakers" had a combined cubic capacity of 24,000 barrels. Today's Lake Fleet can carry over one and a half million barrels.

Navigation into Lake Maracaibo has always been governed by the passage over the lake's outer and inner bars. For many years a channel

was navigable by loaded tankers at high tide only; it was maintained only by natural causes, and by the "scouring" action of ships' propellers continually passing back and forth. By 1937, however, this channel was deteriorating, and it became necessary to restrict traffic. Lago joined a co-operative effort in assisting nature to keep the passage clear, and to make the channel deeper for passage of larger ships. The lake tanker *Invercaibo* was converted to a dredge, and has spent the last ten years sucking sand into the hoppers that replaced its cargo tanks, and dumping it in a distant point in the sea. Since 1938 the channel has been deepened from nine feet to seventeen feet at low water, and intermediate-

Linton Benn whiles away a spare hour fishing in Lake Maracaibo while his ship loads.





The lake tankers thread their way through fields of derricks to pick up cargoes in Lake Maracaibo.

size ocean tankers cross the bar safely at high tide at drafts of over twenty feet.

The ships normally make the round trip, from departure time at Aruba until they are unloaded here and ready to start on the next trip, in approximately three days. Haulage varies somewhat from month to month. In 1947 the monthly average was 378 ship arrivals from Maracaibo, bringing in 11,982,346 barrels per month. A peak was reached in March, 1948, when 434 shiploads totaled 13,762,138 barrels.

The ships that tie up at Lago's docks to take away its finished oil represent almost every sea-going flag: Dutch, Scandinavian, American, British, Panamanian, and many others, including even the Swiss. Beyond the huge oil cargoes loaded in routine business, fuel oil has been pumped into submarines, cruisers and other warships, round-the-world yachts, and whaling ships

on their way to the Antarctic hunting grounds.

Ashore, marine operations occupy 775 men. They man the Fleet and provision it, repair it and keep it shipshape, and operate it on a schedule that best meets the needs of the refinery in Aruba and the producing fields in Venezuela. They act as agents of the owners of all deep sea tankers loading at San Nicolas, often provisioning and repairing them.

As tanker runs go, the 150-mile trip from Aruba to Maracaibo is like a step across the street. The bigger ships on the ocean routes may travel several thousand miles with a single cargo; their routes crisscross the seven seas. The "lakers," on the other hand, shuttle endlessly on the same short route. Since 1925 the oldest of them have traveled nearly a million miles over the same stretch of water. It might well be called "the longest short haul in the world."

## THE HUMAN SIDE

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In all the range of Company assets, none is so valuable as its people: the men and women who, for five years or twenty years or all their working life, are Lago. Financial statements fail to show this. They deal in sales, inventories, and capital investment. Some of Lago's assets can be read in terms of money. But the biggest asset, not shown in reports, is its personnel.

There is a two-way reliance and importance between Company and employee. It is recognized in many ways, some related to the present, some looking to the future.

The employee receives good wages, the prevailing rate for comparable work in the locality, or better. Company plans make it easy for him to take a vacation without financial cares.









He may have the opportunity to advance himself by training, and he is paid while learning. He can "coin his ideas," profiting by his suggestions for ways of improving operations.

His health is safeguarded by the best of medi-

cal facilities. In fact, he or his family calls at the hospital or dispensary for medical attention more than 80,000 times each year.

If he is sick or has an accident, he receives benefit payments—usually in excess of the law's requirements. Death benefits are provided.

The Company helps provide for his future with a retirement plan which will give him an income when he should no longer work for his living.

He and the Company together put money into a thrift fund that helps him to accumulate savings, both for now and the future.

He is important to Lago, today, tomorrow, in





time of emergency, and after he passes the age of working.

After hours employees stop being refinery workers and become plain people. They band together in stamp clubs, study clubs, football clubs, and flying clubs. They swim, or golf, or knock a baseball around, or play cricket. They battle for trophies on a tennis court, a football field, or a pool table. Some study in their free hours to improve themselves. Others just relax. Every so often they celebrate great occasions by gathering by thousands for an all-day sports meet at the Lago Sport Park. They join with others for community activities in organizations of every kind, in every part of the island.

With their families they comprise over half the population of the island—leaders in many things, good citizens.

## LAGO LOOKS AHEAD

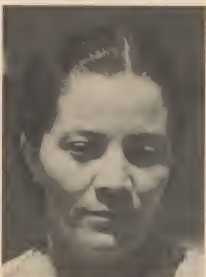
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FOUR HUNDRED YEARS ago Aruba was the center of the fabulous Spanish Main. Galleons and treasure ships, piled with gold and other precious cargo from Panama, Trinidad, and the lands of the southern continent of America, sailed through these waters on their way back to Europe.

Today, as we round out twenty years of refinery operation, Aruba is more important to the world than it ever was in the past. More ships than the Spanish conquerors ever dreamed of sail from here, and their cargoes are infinitely richer. The black gold that pours through the Lago refinery is worth more than all the precious metals that sailed past Aruba's shores.

The world needs petroleum and petroleum products to rebuild the destruction of wars, to mend homes, to raise food, to turn machinery, to fuel trains and trucks and aircraft and ships. Lasting peace, in fact, may well depend upon adequate supplies of oil. Lago, as one of the world's major suppliers of this vital commodity, appreciates its responsibility to all the world, and pledges itself to a future of increasing effort.





While English is the language most commonly spoken in the plant, others in regular use include Papiamento, Dutch, Spanish, French, Portuguese, and Chinese. Lagoites come from North, Central, and South America, almost every island

in the Caribbean, most of the countries of Europe, and as far away as Shanghai and Sumatra. Lago is a "league of nations," with employees representing many dozens of nationalities working together harmoniously.



